

### **REMARKS/ARGUMENTS**

Review and reconsideration of the final Office Action mailed June 24, 2008 (Office Action) is respectfully requested in view of the above amendments and the following remarks. In the Office Action, claims 1-4, 6, 8, 10, 17, 19-26, 29-30, 32-35, 37 and 72-76 were pending, with all claims being rejected under 35 U.S.C. §103(a). By this Amendment, claims 1, 24 and 73 are amended, claims 75-76 are canceled, and claims 77-80 added.

#### **Amendments to the Claims**

Claims 1 and 73 are amended to include the limitation "wherein said nanoporous particles comprise a core comprising a first material, wherein said first material is selected from the group consisting of silica, zirconia, yttria, titania, silicon nitride, silicon carbide, ceria oxide, manganese oxide and doped silica." This is related to the subject matter of claims 75 and 76, which have been canceled, and finds additional support throughout the specification including, but not limited to, page 14, ln. 9-15, page 28, ln. 17 – page 30, ln. 1, and page 37, ln. 5-18.

Claims 1, 24 and 73 were also amended to recite "nanoporous ~~comprising~~ particles" in order to simplify the language used to describe the nanoporous particles of the claimed slurry.

By this Amendment, claims 77-80 are added. The subject matter of claims 77-78 can be found throughout the specification including, but not limited to, page 29, ln. 5-10. The subject matter of claims 79-80 can be found throughout the specification including, but not limited to, page 29, ln. 11-12. No new matter is added.

#### **Claim Rejections – 35 U.S.C. §103**

In the Final Office Action, claims 1-3, 5, 6, 9, 10, 19-23, 31-34, 36-37, and 73-76 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,048,577 issued to Garg (hereinafter "Garg") in view of U.S. Patent No. 5,055,019 issued to Meyer *et al.* (hereinafter "Meyer") and further in view of U.S. Patent No. 6,309,560 B1 issued to Kaufman (hereinafter "Kaufman"). Prior to reviewing the cited references, Applicants wish to review the claimed CMP slurry as set forth in amended claim 1, which recites:

1. (Currently amended) A slurry for chemical mechanical polishing (CMP), comprising:
- a bulk solution including at least one additive selected from the group consisting of an oxidizer, a selective adsorption additive, and a salt, and;
  - a plurality of nanoporous ~~comprising~~ particles, wherein an average particle size of said nanoporous comprising particles is less than 500 nm, wherein said nanoporous particles comprise a core comprising a first material, wherein said first material is selected from the group consisting of silica, zirconia, yttria, titania, silicon nitride, silicon carbide, ceria oxide, manganese oxide and doped silica.

Amended claim 1 recites a CMP slurry, comprising a bulk solution including at least one CMP specific additive (oxidizer, a selective adsorption additive, or salt), and a plurality of nanoporous particles, having an average particle size less than 500 nanometers. In addition, amended claim 1 requires that the core of the nanoporous nanoparticles is silica, zirconia, yttria, titania, silicon nitride, silicon carbide, ceria oxide, manganese oxide or doped silica.

Surprisingly, the inclusion of nanopores in the nanosized particles creates a slurry that results in reduced surface defectivity, *i.e.* fewer scratches, than possible using slurries known in the art. It is believed that result is achieved because the nanopores (i) increase stability of the particles in the slurry & (ii) reduce agglomeration between the nanoparticles. None of these benefits are disclosed or suggested by any combination of the cited art.

Turning now to the cited references. As explained in the Office Action, Garg is drawn to nano-sized powder of alpha-alumina having a glass, e.g., silica, coating disposed thereon. *See* Office Action, page 3; Garg, claim 1. The glass coatings disclosed in Garg can include silica and boron containing materials, such as borosilicate glass. Garg, col. 3, ln. 32-47. In other words, Garg is drawn to nano-sized powder having an alpha-alumina core. The Office Action acknowledges that Garg does not disclose that the alumina powder is nanoporous.

The Office Action asserts that Meyer discloses boehmitic alumina compounds having pore radii in the range of 3 to 100 nanometers. The Office Action asserts that, with the exception of the other elements of a chemical mechanical polishing slurry, the combination of Garg and

Meyer discloses all elements of claims 1-3, 5, 6, 9, 10, 19-23, 31-34, 36-37, and 73-76. The Office Action asserts that Kaufman discloses the remaining elements of the claimed slurries.

Applicants note that both Garg and Meyer are drawn exclusively to alumina particles, whereas the claims require a nanoporous particles having a core material selected from the group consisting of silica, zirconia, yttria, titania, silicon nitride, silicon carbide, ceria oxide, manganese oxide and doped silica. Clearly neither Garg nor Meyer disclose or suggest nanoporous nanoparticles having such a non-alumina core. In fact, Meyer teaches away from such nanoparticles by emphasizing that the particles disclosed therein have a purity of at least 99.95% alumina ( $\text{Al}_2\text{O}_3$ ), *see* Meyer, Abstract & claim 1.

Applicants respectfully submit that the subject matter of the amended claims is not disclosed or suggested by the cited references because (i) neither Garg nor Meyer disclose or suggest a CMP particle core with the claimed non-alumina composition, (ii) none of the cited references disclose or suggest forming a nanoporous powder with a non-alumina core, (iii) none of the cited references disclose or suggest how to form a nanoporous powder with a non-alumina core, and (iv) none of the cited references disclose or suggest forming a CMP slurry with a nanoporous particle having the claimed composition. Accordingly, Applicants respectfully request that the obviousness rejection based on the combination of Garg, Meyer and Kaufman be withdrawn.

The Office Action also includes the following rejections:

Claims 17 and 35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Garg in view of Meyer as applied to claim 1;

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Garg in view of Meyer as applied to claim 1, and further in view of U.S. Patent No. 6,458,017 B1 as issued to Li *et al.* (hereafter “Li”);

Claims 29 and 30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Garg in view of Meyer as applied to claim 1, and further in view of U.S. Patent No. 6,503,418 B2 as issued to Sahota *et al.* (hereafter “Sahota”);

Claims 24 and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Garg in view of Meyer and further in view of Kaufman as applied to claims 1-6, 8-10, 17, and 19-23 above, and further in view of U.S. Patent No. 6,787,061 B1 as issued to Miller. As none of the cited references remedy the deficiencies described above, Applicants respectfully request that these rejection also be withdrawn.

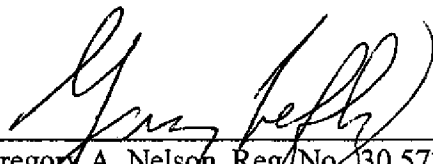
Applicants also note that new claims 77 and 78 are drawn to nanoporous particles having a solid coating comprising a material selected from zirconia, alumina, titania, silicon nitride, silicon carbide, polymeric materials and their mixture. Garg is the only reference that arguably discloses a coating and the Garg coating is limited to a glass. Garg, col. 3, ln. 32-47. The glass coatings disclosed in Garg include silica and boron containing materials, such as borosilicate glass. Thus, none of the cited references disclose or suggest the subject matter of claims 77 and 78.

### **CONCLUSION**

Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. Applicants request that the Examiner call the undersigned (Greg Lefkowitz – 561-671-3624 direct-line) if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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